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Fundamental Melodic Eptachord

Music is the science of **melos**. **Melody**, **time** and **diction** are the three parts of melos. Ingredients of **melody** are **quantity** and **quality**. The quantity of melody expresses the synthesis (πλοκή/ploke) of notes (φθόγγοι/pthogoi) dissimilar to highness and lowness, which are placed in a special arrangement.

Note is the produced stable pitch sound, produced by any instrument. Notes are separated into **isotonic** notes (of the same height/pitch) and **anisotonic.** There are three species of anisotonic notes: the **homophononones**, the **consonant** notes, and the **emmelic** notes. **Homophones** are defined as the notes at the ends of the dia pason (dia okto) consonance, but also by the multiples thereof, because the human perception takes them upon their **conjunction** (κρούση) as one. **Consonant** notes are the closest to the homophones and are the notes at the ends of the dia tessaron consonance (επί γ′ - epitritos/sesquitertian), dia pente consonance (ημιόλιος – hemiolic/sesquialter), and their composition by the dia pason (2/1). Blending (Simultaneous **conjunction)** of two consonant notes give a pleasant listening experience. **Emmelic** notes are the closest to the consonant. Emelic notes are successive notes that produce a pleasant hearing experience and the distances between them (intervals) are expressed only with epimoric/superparticular ratios. The homophonic notes include the consonant notes and consonant incude the emelic notes.

Interval is the sound size that is included between two notes.

Intervals are separated into **consonant** and **inconsonant** as well as in **composite** and **incomposite**. Consonant, are the intervals of dia tessaron, dia pente , and dia pason. All other intervals are inconsonant. The difference between the two fundamental consonances (dia tessaron & dia pente), is called a tone. Composite spaces are called those divided into sub-intervals. Incomposite intervals can not be further divided.

The **eumelia** of all kinds of tones is ensured by the use of intervals expressed in epimoric ratios (x + 1) / x.

We noticed that Didymos divides basic intervals, such as the επί δ′ (5/4 sesquiquartial), επί ιε′ with the following mathematical formula:

$$(\chi+1)/\chi = [(2\chi+2)/(2\chi+1)]*[(2\chi+1)/2\chi]$$

Winnington-Ingram (1932) & Barbera (1978), used the following mathematical formula:

$$\chi/\psi = [2\chi/(\chi+\psi)]*[(\chi+\psi)/2\psi]$$

First epimoric ratio for each string (|) is double. The double is divided into the consonant intervals of dia tessaron & dia pente. Dia tessaron is divided into two pairs of epimoric intervals: on the 5/4 & 16/15, on 6/5 & 10/9, as well as on 7/6 & επί 8/7. The dia pente is divided into two pairs of intervals: on the 4/3 and on the 9/8, as well as on the 5/4 and 6/5.

Every composite interval is defined as a systema/system.

Systemata are divided into **consonant** and **disconsonant**, as well as **continuous** and **exceeded**.

Continuous systems are called what all of the notes are emelic, and whether every consecutive notes (interval pair) should form intervals that are expressed from epimoric ratios, or every four consecutive notes to form the 4/3 or 5/4. Of all the possible combinations of successive epimoric ratios, the largest continuous system that can be derived is a continuous tetrachord, which is also perfect. In other words, it is argued that from any free chord only one perfect continuous tetrachord systema can be formed, which results in the formation of a fundamental heptachord system (seven chord systema).

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 α             β     γ       δ         ε        στ      ζ
 |     6/5     |25/24| 16/15 |   9/8   |  10/9  | 16/15 |
1/1                 5/4     4/3       3/2      5/3    16/9
              1/1           10/9      5/4
                    1/1               6/5      4/3
                              1/1               5/4     4/3
                                        1/1             32/27
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fundamental heptachord system (θ.σ.)

From the lowness (pitch) note (|a, chord α) to the highness (|ζ), are formed the intervals of: **επί ε′**, **επί κδ′**, **επί ιε′**, **επί η′**, **επί θ′** και **επί ιε′**. Created trichord systemata of **επί δ′**, του **επί θ′** and **επί ε′** as well as tetrachord systemata of **επί γ′** and **επί δ′**.

Higher than | δ there can be no systema continuity, since the **επί θ′** and the **επί ιε′** do not form an epimoric ratio (32/27).

In all other cases, the systems are named exceeded.

What has been said above rejects the theory of the genera of harmonic theory, which seemed to disregard the proposed principle of continuity of systemata. The elements that contributed to the proposed theoretical were: a) Ptolemy's theory, according to which all the intervals of anisotonic notes are expressed with anisotonic ratios, b) the genera attributed to the Didymus, c) the experimental-acoustic confirmation, and d) the mathematical documentation .

Experimentally, using two software (scala, zynaddsubfx) and a fretless guitar, it was confirmed that from all tetrachord divisions of harmonic writers, the systema resulting from the conjuction (σύναψη/synapsis) **of the diatonic and the chromatic genera of Didymus is the main structural component, which uses all kinds of melody. With more caution, it was observed that the diatonic genus of Didymus is the product of applying the principle of continuity to the chromatic.**

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SOFTWARE